Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of	)	
	)	
Authorization and Use of Software Defined Radios	)	**ET Docket No. 00-47**
	)	
	)	

REPLY COMMENTS OF THE
INDUSTRIAL TELECOMMUNICATIONS ASSOCIATION, INC.

The Industrial Telecommunications Association, Inc. (ITA) hereby respectfully submits its reply comments in response to the Federal Communications Commission's Notice of Proposed Rule Making (NPRM) in the above-referenced matter.[1] As ITA noted in its comments responding to the initial Notice of Inquiry in this proceeding, ITA is optimistic that Software Defined Radio (SDR) will permit more efficient use of available spectrum.[2] As discussed below, however, ITA supports the general consensus among commenters that the use of SDR to facilitate spectrum management is premature at this time. Additionally, ITA agrees with those commenters who advocate enhanced enforcement capabilities on the part of the Commission to guard against noncompliant use of SDR technology. While SDR's technological agility can prove a useful and powerful tool, the Commission and industry participants must work together to ensure that SDR's capabilities are not misused, to the detriment of efficient spectrum utilization.

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1 *See* Authorization and Use of Software Defined Radios, *Notice of Proposed Rulemaking*, ET Docket No. 00-47 (rel. Dec. 8, 2000) (NPRM).

2 Comments of the Industrial Telecommunications Association at 2 (filed June 14, 2000) (ITA NOI Comments) (Note that all other comments referenced herein were filed in response to the NPRM).

I. Statement of Interest

ITA is a Commission-certified frequency advisory committee coordinating in excess of 6,000 applications per year on behalf of applicants seeking Commission authority to operate business and industrial/land transportation radio stations on frequency assignments allocated between 30-900 MHz.

ITA enjoys the support of a membership including more than 3,500 licensed two-way land mobile radio communications users, private mobile radio service (PMRS) oriented radio dealer organizations, and the following trade associations:

Alliance of Motion Picture and Television Producers
Aeronautical Radio, Inc.
Associated Builders & Contractors, Inc.
Florida Citrus Processors Association
Florida Fruit & Vegetable Association
National Mining Congress
National Propane Gas Association
National Ready-Mixed Concrete Association
National Utility Contractors Association
New England Fuel Institute
United States Telephone Association

In addition, ITA is affiliated with the following independent market councils: the Council of Independent Communication Suppliers (CICS), the Taxicab & Livery Communications Council (TLCC), the Telephone Maintenance Frequency Advisory Committee (TELFAC), and USMSS, Inc.

II. Background

On December 8, 2000, the Commission released the above-referenced NPRM, proposing amendments to Part 2 of its rules in order to streamline equipment authorization procedures for SDRs. In addition, the Commission commented on industry responses to its companion Notice of

Inquiry[3] regarding the state of SDR technology, the equipment approval process, and the ability of SDR to increase spectrum efficiency and improve interoperability. The Commission noted that "the initial deployment of [SDR] is under way," and "[t]he technology is continuing to develop and significant new technical capabilities will be possible."[4] The Commission tentatively concluded that there was no need to propose rule changes to either improve interoperability[5] or "to increase the efficiency of spectrum use as related to SDR . . . ."[6]

III. Discussion

As discussed below, ITA joins commenters in their optimism that SDR promises to develop into a useful tool to maximize spectrum efficiency;[7] nevertheless, SDR technology remains in its nascent stage and its ability to increase spectrum efficiency or sharing opportunities can be neither determined conclusively nor relied upon for spectrum management purposes. ITA additionally believes that the flexibility of SDR, which may prove useful for increasing efficiency and interoperability in the long term, may also increase the risk of non-compliant use and therefore warrants increased FCC enforcement capabilities.

A. The Use of SDRs as a Spectrum Management Tool

As the FCC notes in its NPRM, SDR technology offers new possibilities for using spectrum because an SDR "could be programmed to transmit and receive on any frequency and to use any desired transmission format within the limits of its design, affording the user substantial

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3 Inquiry Regarding Software Defined Radios, *Notice of Inquiry*, ET Docket No. 00-47, 15 FCC Rcd 5930 (rel. March 21, 2000) (NOI).

4 NPRM at ¶ 11.

5 *Id.* at ¶ 13.

6 *Id.* at ¶ 15.

7 *See, e.g.*, Comments of American Petroleum Institute at 3 (API Comments) (stating that "API shares the Commission's belief that SDRs may enhance spectrum efficiency and the interoperability of communications systems . . . "); Comments of AirNet Communications at 2 (AirNet Comments) (stating that "SDR promises significant improvement in the efficiency of spectrum use").

flexibility to operate in multiple radio services."[8] SDR could also "facilitat[e] spectrum sharing and . . . allow[ ] equipment to be reprogrammed to more efficient modulation types."[9] In its comments responding to the NOI, ITA similarly noted that SDR technology could "enhance efficient spectrum management," and cited its ability to expedite the transition to narrowband technology as an example of potential SDR efficiencies.[10]

ITA agrees with commenters, however, that notwithstanding the benefits SDR may provide in the future, it is inappropriate to consider SDR as a substitute for spectrum allocations and management. SDR technology remains in a developmental stage, as noted by both the FCC and commenters, and rule changes with respect to spectrum management are unwarranted at this time.[11] As Cingular Wireless LLC explains, proposing rule changes to increase spectrum efficiency is premature: "[m]aking spectrum policy changes before [SDR] technology has gained sufficient penetration in the market could put an unnecessary burden on equipment manufacturers as well as service providers, possibly stifling the benefits of the technology."[12] Likewise, Nortel Networks Inc. states that while SDR "may . . . prove useful in the longer term in achieving spectrum flexibility and efficiency by accessing small noncontiguous blocks or 'slivers' of spectrum," there nevertheless remain "significant technical issues to be addressed before SDR technology plays a major role in simplifying spectrum management."[13]

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8 NPRM at ¶ 3.

9 *Id.* at 4.

10 ITA NOI Comments at 3.

11 *See* NPRM at ¶ 11; Comments of Cingular Wireless, LLC at 2, 9 (Cingular Comments) (stating that "SDR is still at the early stage of development" and "is still in its infancy"); Comments of the SDR Forum at 2 (SDR Forum Comments) ("The Commission's understanding of the state of SDR technology . . . strikes the appropriate balance between the huge promise of SDR, and the recognition that additional advances must be made before its most exciting prospects can be fully realized."); AirNet Comments at 2 ("AirNet supports both the Commission's vision for the future and its resistance to the rule changes in these areas until it becomes necessary.").

12 Cingular Comments at 9.

13 Comments of Nortel Networks, Inc. at 2. *See also* SDR Forum Comments at 2 (stating that

ITA further agrees with AT&T Wireless Services, Inc., which cautions that SDR should not be considered as an alternative to new spectrum allocations and continued spectrum management.[14] ITA joins AT&T in its support of comments responding to the NOI that "the Commission should not change its spectrum allocation and management policies to account for SDRs."[15] SDR's ability to allow for facile use of "fallow" frequencies is no substitute for the accessibility of additional frequencies, made available through new spectrum allocations. The Commission should continue to allocate and manage spectrum use in a rational, deliberate manner that takes into account technological capabilities and compatibility with incumbent, neighboring spectrum users.

By the same token, ITA agrees with AT&T that the Commission should not permit open access to the airwaves "in which a Commission licensee's exclusively-issued frequency assignments are fair game to any user or provider whose SDR is able to detect an operating 'window' that would purportedly permit operation of the SDR without interference to the Commission licensee's system."[16] Not only would this "open range" approach upset the established "business plans and expectations of licensees that have secured exclusive spectrum assignments on a licensed basis," as AT&T rightly explains,[17] but such "use" is currently not feasible without creating the potential for harmful interference.

"SDR promises—in the long run—significant improvement in the efficiency of spectrum use" and that the "SDR Forum . . . supports . . . the . . . long-term hopes for SDR's . . . spectrum-sharing capabilities, as well as its realization that these capabilities do not call for rule changes at this time").

14 Comments of AT&T Wireless Services, Inc. at 6.

15 *Id*.

16 *Id.* at 6-7.

17 *Id*. at 7.

To this end, ITA cautions that the optimism expressed by Clearwire Technologies, Inc. and Vanu, Inc. that SDR will remove the need for uniform, permanent spectrum allocations[18] is premature at best and mistaken at worst. Similarly, in response to Clearwire's suggestion that "SDRs could make relocation [of existing services] feasible in some cases,"[19] ITA submits that the Commission should be cautious and refrain from considering SDR as a relocation tool. Again, as expressed above, SDR technology is not yet developed and, even if it were, upsetting established procedures and expectations should not be undertaken lightly, if at all. Accordingly, ITA recommends that the Commission adopt its tentative conclusion and defer any action with respect to spectrum management until SDR technology is more developed. Moreover, any future rulemaking initiative should take place in a separate proceeding so that industry members can focus solely on the complex issues raised by spectrum allocation and management questions.

B. Increased Enforcement Capabilities

The Commission expressly recognizes "that a non-compliant software defined radio has the potential to interfere with other radio services due to its potential to operate in multiple frequency bands."[20] In response to the Commission's inquiry into whether it "should enhance [its] enforcement capabilities,"[21] ITA joins commenters who believe that additional enforcement is necessary[22] and, by the same token, disagrees with those who suggest that "existing safeguards

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18 *See* Comments of Clearwire Technologies, Inc. at 2 (Clearwire Comments) ("SDRs will ultimately eliminate the need for uniform spectrum allocations."); Comments of Vanu, Inc. at 4 (stating that "SDRs will end the need for lock-step, permanent spectrum allocations," "will accommodate allocations that vary from place to place, and from time to time," and will "permit transparent global roaming").

19 Clearwire Comments at 2.

20 NPRM at ¶ 34.

21 *Id.*

22 *See* API Comments at 8 ("API concurs with the Commission's conclusion that, despite authentication and other requirements, there will be a need for enhanced enforcement capabilities. [API] shares the concern that non-complying software and SDRs could interfere with other authorized users, especially those who maintain critical infrastructure facilities.") (internal citation omitted); Comments of Elite Electronic Engineering at 2 ("Elite Comments") ("We believe the FCC should enhance their

are sufficient" to protect against unlawful operation of SDR equipment[23] or that SDR does not pose "any more threat than any other radio devices and existing enforcement capability is more than adequate to prevent unauthorized modifications to SDR."[24] It is precisely because SDR technology has the potential to utilize differing frequencies and be reprogrammed in the field—unlike other radio devices—that the FCC has initiated this proceeding. ITA encourages the Commission to consider the adoption of enforcement mechanisms to guard against the noncompliant use of SDRs. One enforcement option, as Cingular suggested and as echoed by Elite Engineering, is the assessment of forfeitures that underscore the importance of transmitting within authorized parameters: "The Commission should assess heavy forfeitures when interference is caused by an SDR device that is not operating in accordance with its authorized parameters."[25] The Commission should aggressively enforce its regulations to ensure that SDR equipment is compliant.

IV. Conclusion

ITA remains optimistic that as SDR technology develops, it will increase equipment functionality and facilitate more efficient use of spectrum. Nevertheless, as discussed above, the Commission's tentative conclusion that it should not implement any rule changes with respect to SDR and spectrum management is accurate. SDR technology is in a nascent stage of development and its spectral benefits cannot be accurately assessed or relied upon. ITA believes that the Commission should defer spectrum management questions concerning SDR for a later, separate rulemaking proceeding. At the same time, as market penetration of SDRs increases, so

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enforcement capabilities because non-compliant SDRs have the potential to interfere with other radio services due to its potential to operate in multiple frequency bands.").

[23] SDR Forum Comments at 14.

[24] AirNet Comments at 6.

[25] Cingular Comments at 6. *See also* Elite Comments at 2 ("[T]he FCC should ensure that the

does the opportunity for interference caused by unauthorized use. The Commission should enhance its enforcement capabilities both to prevent and, if necessary, penalize the unauthorized use of SDR technology. By working in tandem, the Commission and industry can ensure that SDR's agility is harnessed to provide efficient spectrum use.

Respectfully submitted,

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penalties for noncompliance are severe enough to be a true deterrent.").